

DIABETIC NEPHROPATHY GUIDELINES

The earliest clinical evidence of nephropathy is the appearance of low but abnormal levels (30-300 mg/day or 20-200 µg/min) of albumin in the urine, referred to as microalbuminuria. Microalbuminuria, a harbinger of renal failure and cardiovascular complications in diabetes, is an albumin concentration in the urine that is greater than normal (but is not detectable with common urine dipstick assays for protein).

Screening for Albuminuria

Adults with type 2 diabetes should be screened for microalbuminuria at diagnosis and at least yearly thereafter. For those with type 1 diabetes, screening should begin after five years of disease duration. If the screening is positive for microalbumin, a quantitative measure is helpful in developing a treatment plan. Three methods to screen for microalbuminuria are shown below:

- 1) measurement of the albumin to creatinine ratio in a random spot urine collection
- 2) 24-hour urine collection with creatinine, allowing the simultaneous measurement of creatinine clearance
- 3) timed (4-hour or overnight) urine collection for albumin and creatinine

The first method is often preferred in an office-based setting and generally provides accurate information. There is marked day-to-day variability in albumin excretion, so at least 2 of 3 samples done in a 3- to 6-month period should show elevated levels before designating a patient as having microalbuminuria. If normal, repeat yearly. Screening for microalbumin with dipsticks or reagent tablets may also be done if assays are not readily available. Reagents and tablets show a 95% sensitivity when performed by trained personnel. All positive tests by reagent strips or tablets should be confirmed using one of the quantitative urine assays listed below.

Category	Spot Collection (µg/mg creatinine)	24-Hour Collection (mg/24hours)	Timed Collection (µg/min)
Normal	< 30	< 30	< 20
Microalbuminuria	30 - 299	30 - 299	20 - 199
Clinical Albuminuria	≥ 300	≥ 300	≥ 200

Several factors may influence the albumin excretion rate. Screening should be postponed in the following situations: short term hyperglycemia, exercise, marked hypertension, urinary tract infection, acute febrile illness, or heart failure. ACE inhibitors or NSAIDs may also influence results.

Hypertension and Nephropathy

To reduce the risk or slow the progression of nephropathy, optimal glucose and blood pressure control are recommended. Both systolic and diastolic hypertension markedly accelerate the progression of diabetic nephropathy. Control of hypertension—regardless of agent used—has been demonstrated conclusively to reduce the rate and progression of nephropathy and to reduce the complications of cerebrovascular disease and cardiovascular disease. **Refer also to the Cardiovascular and Hypertension sections.**

Pharmacologic Therapy

For patients with either micro- or macroalbuminuria, either ACE inhibitors or angiotensin II receptor blockers (ARBs) should be used. To assess hyperkalemia, serum potassium levels should be monitored in patients treated with either class of medication. Clinical trials reveal the following observations:

- In patients with type 1 diabetes and microalbuminuria, whether hyper- or normotensive, ACE inhibitors delay the progression of nephropathy.
- For type 2 patients with both hypertension and microalbuminuria, both ACE inhibitors and ARBs delay the progression to macroalbuminuria.
- In type 2 patients who have hypertension, macroalbuminuria, and renal insufficiency, ARBs delay the progression of nephropathy.
- Dihydropyridine calcium channel blockers (DCCBs) are less likely to slow the progression of nephropathy compared with ARBs.
- Beta-blockers or non-DCCBs may be considered for those unable to tolerate ACE inhibitors or ARBs.
- Due to their teratogenic potential, caution is advised when using either ACE inhibitors or ARBs in women of childbearing age.

Modified from: American Diabetes Association (Position Statement). Diabetic Nephropathy. Diabetes Care 26 (Supplement 1): S94-S98, 2003.

Sources:

American Diabetes Association (Position Statement). Treatment of Hypertension in Diabetes. Diabetes Care 26 (Supplement 1): S80-S82, 2003.

American Diabetes Association (Position Statement). Standards of Medical Care for Patients with Diabetes Mellitus. Diabetes Care 26 (Supplement 1): S33-S50, 2003.